

the region discussed by Doctor Hann was but some seven or eight thousand square miles in extent, the domain of the Indian climatologist amounts to above two million square miles, including, in addition to the Indian Peninsula, stations in Ceylon, Burma, Persia, and Afghanistan, and even stations so remote as Aden, Mauritius, and Zanzibar.

This vast territory is, of course, hardly amenable to the methods of discussion employed by Doctor Hann. The number of stations represented in connection with the various elements other than rainfall ranges from 107 to 171, while the number of rainfall stations included is 2219. Only in the case of the rainfall values is there any attempt at topographic grouping. In the other tables the stations are arranged roughly in a series, beginning in Burma, stretching thence, by way of the Ganges plain and the Himalayas, to the north-west frontier; then, taking a fresh start at Colombo (Ceylon), passing up the Malabar coast, thence across the Deccan and down the Coromandel coast, and winding up at Trincomalee (Ceylon), after which come various islands and other outlying and extra-Indian stations. The climatic regions indicated on the various charts published by the Indian Meteorological Service are not distinguished typographically in these tables, and no regional means are given. This is to be regretted; but perhaps we should consider this memoir as a mere provisional compilation, since the values which it embraces were, as the compiler states, computed in order to furnish the data for a Climatological Atlas of the Indian Empire, the early publication of which has been sanctioned by the government of India. At any rate every meteorologist will welcome the appearance of so vast an array of normal values for this important region, whose climate is so frequently made the basis of investigations of the great problems of the atmosphere, and is so often called upon to furnish the weapons of controversy to the meteorological theorists. While previous publications of the Indian Service have contained normal values, introduced generally in connection with current values for purposes of comparison, these are now for the first time brought together in a compact volume devoted to the presentation of normals exclusively, and constituting a standard reference book upon Indian climate. Among the distinguishing features of this work are the reduction-constants, for various elements, given for each station, whereby true daily means may be obtained from the means of the observed readings. The methods of obtaining these constants have been discussed in previous numbers of the Indian Meteorological Memoirs. These corrections are applied in the tables, and thus we have what purport to be true diurnal means of the several elements. Other noteworthy features are a table of average monthly and annual mean temperatures reduced to sea level, and tables of the average monthly and annual "steadiness of the wind" at observation hours and for the day.

Minor contributions to climatology have of late appeared in such numbers that it is not easy to select those most worthy of mention. The present year has witnessed the beginning of an important series of publications entitled Climatological Observations at Colonial and Foreign Stations, in which the British Meteorological Council will publish summaries of the observations which it receives from the Foreign Office, the Colonial Office, and directly from observers in various British dependencies and in foreign countries. This undertaking recalls the valuable Meteorological Observations at the Foreign Stations of the Royal Engineers and the Army Medical Department, which appeared in a single volume published in 1890. It is a similar work to that undertaken by the Deutsche Seewarte, in its Ueberseeische Beobachtungen, except that the British reports are apparently not to contain daily values. In the first and only number which has come to hand—Tropical Africa, 1900–1901–1902, with Summaries for Previous Years—we have the various yearly summaries

for each station in the region indicated brought together, and a few lustral means also appear. It is to be hoped that future publications in this series will give us averages derived from the whole extent of each record; in other words, provisional normals, which the record of each subsequent year will bring nearer to the true normal values for the station.

In the enumeration of recent contributions to climatology might, of course, be included a number of well-known serial publications, appearing at fixed intervals, which regularly include normals brought up to date. These, however, the writer hopes to discuss in a subsequent paper, in connection with certain standard reference books of climatology.

The establishment of normal values, or rather of series-means which are a more or less close approximation to normal values, is now going forward apace, and the climatologist begins to hope that all of the world's vast accumulation of meteorological observations will soon have been made to bear fruit in the shape of summarized climatological data. In this connection reference may be made to the forthcoming Climatology of the United States, now in preparation in the Central Office of the Weather Bureau, which will give in a concise form the normal climatic values for upward of 600 stations in our own country. Professor Henry, who has this work in charge, hopes that it will be ready for distribution by the autumn of 1905.

RECENT PAPERS BEARING ON METEOROLOGY.

MR. H. H. KIMBALL, Librarian and Climatologist.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a —.

Science. New York. Vol. 20.

Bishop, S. E. The cold-current system of the Pacific, and source of the Pacific Coast Current. Pp. 338–341.

Smithsonian Miscellaneous Collections. Washington. Vol. 2.

Fowle, F. E., Jr. The absorption of water vapor in the infra-red solar spectrum. Pp. 1–12.

Nature. London. Vol. 70.

— Marconi weather telegrams. Pp. 396–397.

Eliot, John. The British Association at Cambridge. Section A. Subsection Cosmical Physics. Opening Address. Pp. 397–406.

Cohen, J. B. Sooty rain. P. 424.

Ashworth, J. R. A source of the ionisation of the atmosphere. P. 454.

Proceedings of the Royal Society. London. Vol. 74.

Lockyer, Norman and Lockyer, William, J. S. A probable cause of the yearly variation of magnetic storms and auroræ. Pp. 90–95.

Science Abstracts. London. Vol. 7.

B[orns], H. Heat exchange in the soil, the water and the atmosphere. [Abstract of article of J. Schubert.] P. 572.

Scottish Geographical Magazine. Edinburgh. Vol. 20.

— Meteorological results of the Belgian Antarctic Expedition. [Review of a pamphlet by H. Arctowski.] Pp. 493–494.

Symons's Meteorological Magazine. London. Vol. 39.

Gethin-Jones, J. R. The wettest place in Wales, with some remarks on the rainfall of the year 1903. Pp. 121–126.

— Wireless telegraph and meteorology. Pp. 127–128.

Annuaire de la Société Météorologique de France. Paris. 52^{me} année.

Teisserenc de Bort, L. Observations de la station franco-scandinave de sondages aériens à Haid. Pp. 159–161.

David [P]. Sur la distribution annuelle moyenne et extrême de la pluie dans les Îles Britanniques. [Analysis of a paper by Dr. Mill.] Pp. 161–165.

Angot, Alfred. La pluie à Bouin (Vendée). Pp. 173–177.

Archives des Sciences Physiques et Naturelles. Genève. 4^{me} période. Tome 17.

Forel, F. A. Variation de température avec l'altitude. P. 207.

Ciel et Terre. Bruxelles. 25^{me} année.

— Le climat du désert de Syrie. Pp. 303–304.

Comptes Rendus de l'Académie des Sciences. Paris. Tome 139.

Chauveau, A. B. Sur la déperdition de l'électricité dans l'air, observée au sommet de la tour Eiffel pendant l'orage du 4 août. Pp. 400-401.

Roche, —. Observations sur la foudre en boule tombée à Autun le 16 juillet [1904]. P. 465.

La Nature. Paris. 32me année.

Jaubert, Joseph. La pluie dans la région parisienne. Pp. 202-203.

Jacquot, L. Le vent et les vagues sur le Lac Léman. P. 206.

D. B. Le service des annonces des crues aux États-Unis. Pp. 207-208.

Touchet, Em. Le halo solaire du 25 juillet, 1904. Pp. 210-211.

Le Temps qu'il Fait. Mons. Août, 1904.

Bracke, A. La météorologie en publique. Pp. 171-175.

Memorie della Società degli Spettroscopisti Italiani. Catania. Vol. 33.

Teglio, Emiglio. A proposito di due memorie di Knut Angström sulle caratteristiche spettrali dell'ozono. Pp. 141-147.

Annalen der Hydrographie und Maritimen Meteorologie. Berlin. 32 Jahrgang.

Meinardus, Wilhelm. Ueber Schwankungen der nordatlantischen Zirkulation und ihre Folgen. Pp. 353-362.

Maurer, H. Die tägliche Variation des Erdmagnetismus. [Abstract of work by Askel S. Steen.] Pp. 385-388.

Wegemann, [G.] Erweiterung des barischen Windgesetzes nebst Anwendungen. 1. Beziehung zwischen Windgeschwindigkeit und Isobarenabstand. Pp. 408-415.

Brennecke, W. Einige Ergebnisse der dänischen Expedition nach Ostgrönland 1898-1899. Pp. 415-419.

Gaea. Leipzig. 40 Jahrgang.

— Die atmosphärische Elektrizität und die Elektronentheorie. Pp. 529-532.

— Zusammensetzung der atmosphärischen Luft. [Review of work of H. Henriot.] P. 568.

— Die Stellung der Meteorologie unter den Wissenschaften. Pp. 584-592.

Physikalische Zeitschrift. Leipzig. 5 Jahrgang.

Bumstead, H. A. Atmosphärische Radioaktivität. Pp. 504-509.

Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften. Berlin. 40 Bd.

Warburg, E. Ueber den spektralanalytischen Nachweis des Argons in der atmosphärischen Luft. Nach Versuchen des Hrn. Lillienfeld. Pp. 1196-1197.

Das Weltall. Berlin. 4 Jahrgang.

— Ueber internationalen Wolkenmessungen. [Abstract of paper of [R.] Süring.] Pp. 423-424.

Das Wetter. Berlin. 21 Jahrgang.

Köppen, W. Ueber den Zusammenhang zwischen der Stärke der Platzregen und ihrer Dauer. Pp. 169-177.

Meteorologische Zeitschrift. Wien. Band 21.

Ekholm, Nils. Wetterkarten der Luftdruckschwankungen. Pp. 345-357.

Süring, R. Bericht über die Ergebnisse der deutschen Wolkenbeobachtungen im internationalen Wolkenjahre. Pp. 358-371.

Stentzel, Arthur. Ueber die sogenannte "Temperatur des Welt- raumes." Pp. 371-375.

— Atmosphärische Absorption und Emission der äussersten ultravioletten Strahlen. (Uebersetzt aus "Nature," 14 Januar, 1904). Pp. 375-376.

Drapczyński, Viktor. Ueber die Luftströmung in der Umgebung der Barometer-Minima und -Maxima zu Moskau. Pp. 376-377.

— Krebs, W. über boraartige Fallwinde an Gebirgsseen. Pp. 377-378.

Mache, H. Ueber die Geschwindigkeit und Grösse der Regentropfen. Pp. 378-380.

Friesenhof, Gregor. Einiges über Ozonbeobachtung. Pp. 380-382.

— Hanamann, J. Niederschlagsbeobachtungen in Lobositz (Böhmen.) P. 382.

Forster, Adolf E. Die klimatischen Verhältnisse von Eger-Franzensbad und Marienbad in Böhmen. Pp. 382-383.

Hann, [Julius]. Klima von Formosa. (Taiwan). Pp. 383-387.

— Danckelmann, R. Resultate der Regenmessungen in Debundscha. Pp. 387-388.

Réthly, Anton. Starker Hagelfall zu O-Gyalla. Pp. 388-389.

Götz, P. Merkwürdige Erscheinung am Abendhimmel. Pp. 390-391.

Meinardus, W. Repartition de la pression atmosphérique sur l'Europe, observée de 1881 à 1895, et direction moyenne du vent sur les littoraux. [Review of work of G. Rung.] Pp. 391-392.

EARTHQUAKE OF AUGUST 27, 1904.

By Prof. C. F. MARVIN.

An earthquake was recorded by the Omori seismograph at the Weather Bureau on August 27, beginning at 5^h 4^m 57^s p. m., seventy-fifth meridian time.

The disturbance was evidently of great severity, that is to say, the amplitude of motion of the earth particle (5.35 mm.) during the maximum waves was fully seventeen times as great as in the case of any earthquake thus far recorded at the Weather Bureau. So far as known, however, the earthquake was not felt by any individuals in Washington, or at any other point in the United States. The record is exceedingly clear and perfect in all details. A small section of the middle portion of the sheet, showing the maximum waves of the principal portion, is reproduced in fig. 1.

The MONTHLY WEATHER REVIEW for June, 1903, at page 271, gives a description of the seismograph.

The following table gives the times of the principal features of the record. The north and south component of horizontal motion only was recorded.

Earthquake of August 27, 1904, seventy-fifth meridian time.

	<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
First preliminary tremors began.....	5	4	57 p. m.			
Second phase began.....	5	12	07 p. m.			
Second preliminary tremors began.....	5	15	59 p. m.			
Principal portion began.....	5	21	39 p. m.			
Principal portion ended.....	5	26	42 p. m.			
End of earthquake.....	6	24	41 p. m.			
Duration of first preliminary tremors.....				0	11	2
Duration of second preliminary tremors.....				0	5	40
Duration of principal portion.....				0	5	3
Total duration of earthquake.....				1	19	44
Average complete period of 4 large initial waves, principal portion.....						24.1
Average complete period for 4½ large waves at end of principal portion.....						14.9
Period of pendulum.....						26.0
Maximum double amplitude of actual displacement of earth at seismograph.....				5.35	mm.	
Magnification of record.....				10	times.	

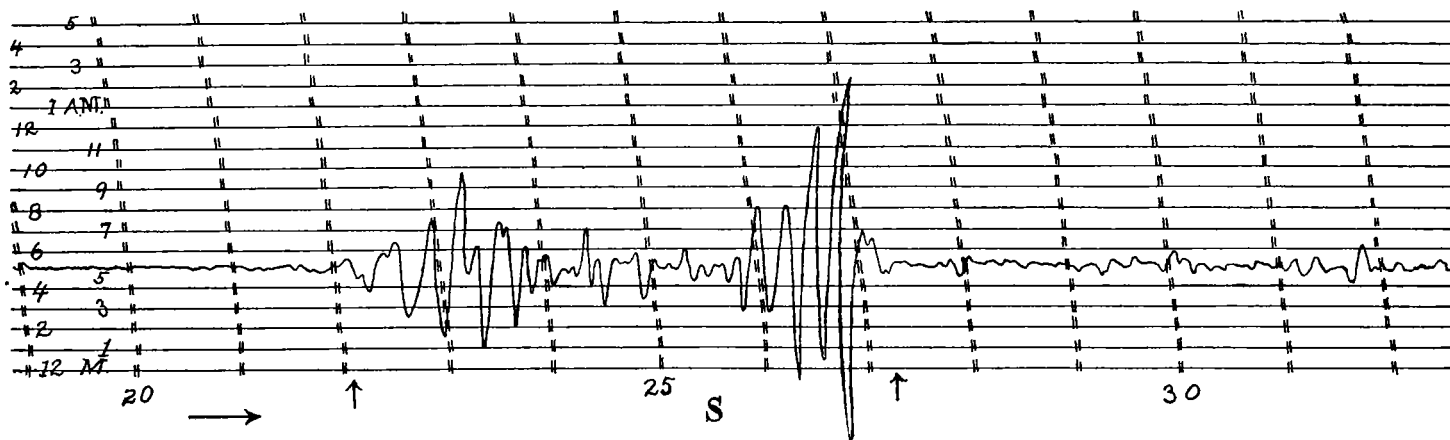


FIG. 1.—Principal of portion of record of the earthquake of August 27, 1904.